

INVITED CLINICAL SUGGESTION, "ON THE SIDELINES" RECOGNITION AND MANAGEMENT OF ABDOMINAL INJURIES AT ATHLETIC EVENTS

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ABSTRACT

Most athletic events present potential for abdominal trauma for their participants. The responsibility of the "most medical" professional at the event is to have the knowledge to recognize, treat, and properly manage these injuries. As these injuries are very different in nature from orthopedic injuries, the dangers presented are also very different, and can include outcomes as serious as organ failure and death. Because of these differing risks, many professionals are uneasy about proper treatment, especially on the sidelines. However, with a few key points about mechanism of injury, monitoring changes in vital signs, and careful assessment of presenting symptoms, most abdominal injuries can be properly managed on the sidelines.

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Level of Evidence: 5

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INTRODUCTION

Abdominal injuries in athletes can range in severity from abdominal strains to internal bleeding, and even insignificant injuries can prove to be incredibly painful. Therefore, the importance of the sports physical therapist's knowledge of abdominal injuries is imperative. The most medical professional in the stadium or arena must understand the signs and symptoms, possible risks, as well as the mechanism of injury of many of these common injuries in order to properly treat the athlete, and decide whether "proper treatment" is to hold them out of the game or transport them to emergency care. Abdominal injuries in the athlete are among the most potentially dangerous, and the importance of understanding these injuries cannot be understated.

BACKGROUND AND ANATOMY

The abdomen is a relatively unprotected area; susceptible to trauma such as contusions, lacerations, puncture wounds, and herniations. The abdomen (unlike the thorax) has no bony structural protection and relies solely on soft tissue in the form of the abdominal wall, fascial layers, and skin for protection. (Figure 1). The abdominal cavity houses many of the vital organ systems, which could be injured during sport. (Figure 2) This structural difference in support and protection allows for a wide variety of injuries to occur in both collision and contact sports. The sports physical therapist must be well trained in assessment and management of abdominal injuries as a part of specialty practice.

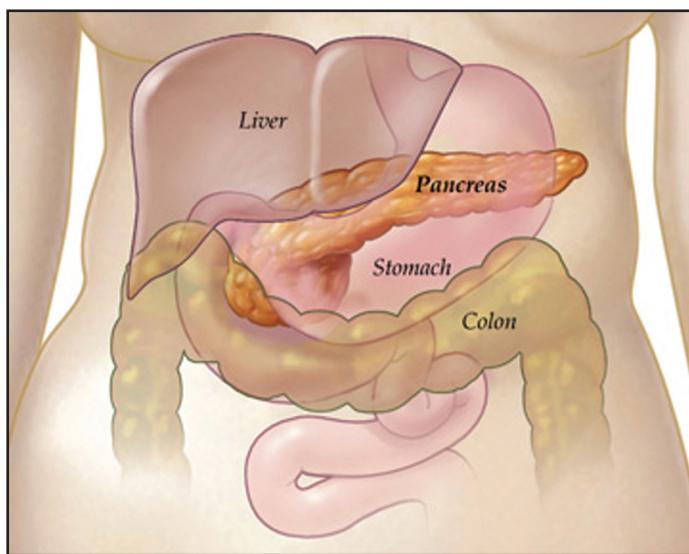


Figure 2. Anterior view of the abdominal contents. The spleen and kidneys are not visualized but are a part of the abdominal contents.

INJURIES

One of the most common injuries to the abdomen is a blow to the solar plexus, which gives a momentary paralysis of the diaphragm and the sensation of having "the wind knocked out of you." These injuries can happen from being hit in the stomach with a shoulder, a helmet, or falling onto a hard object such as a ball. Although a relatively insignificant injury, likely to pass without much intervention, it can cause significant distress in the athlete as it is occurring. The athlete will experience substantial pain and acute shortness of breath, which often incites the feeling of panic. The sideline PT's job in this situation is to recognize the injury and assist the player in calming down and resuming normal breathing.

Hernias are protrusions of the intestines through the abdominal wall, and most often occur through the femoral ring or the inguinal canal. With the femoral ring, the intestines protrude below the inguinal ligament and through the femoral canal, and with the inguinal area, the intestines protrude through the inguinal canal along with the spermatic cord. With either of these types of hernia, the main cause is a sharp increase in abdominal pressure due to a muscle contraction or an applied external pressure. The athlete may or may not present with tenderness or a palpable mass at the site of herniation, but if a hernia is suspected, immediate action is required to

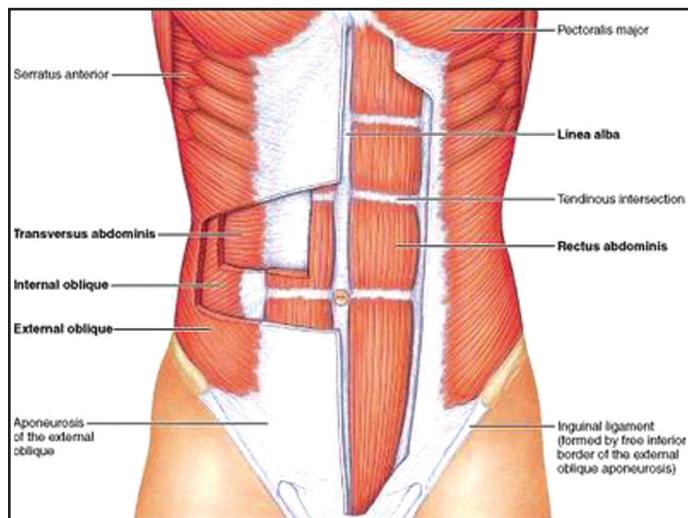


Figure 1. Musculature of the abdominal wall, offering minimal protection to the organs beneath.

prevent strangulation of the intestine and subsequent tissue necrosis.¹

The abdominal muscles are the main support for the abdominal area and therefore are susceptible to multiple types of injuries. The athlete can sustain overuse injuries and strains of the abdominal region due to its functional importance in the maintenance of balance and stability, and the linking of the upper quarter to the lower quarter. This is especially apparent in throwing athletes where abdominal strains are common and frequently cause time loss from sport. These muscular injuries should be treated as any other strain of a muscle would, with active rest, reduction of inflammation and appropriate stretching and strengthening. Minor traumas resulting in mild pain are common but severe contusions to the abdominal musculature are rare. The muscle and abdominal contents are soft and thus able to dissipate the majority of most blunt trauma, so bruising and soreness are the most common symptoms, but underlying injury to soft tissues and organs must be considered.²

Organ damage is potentially the most dangerous abdominal injury seen on the sidelines. It is usually caused by blunt trauma to the abdomen, and fatal internal bleeding or organ failure can result. Obviously if any sort of substantial penetrating injury has occurred to the abdomen, organ damage must be assumed and proper wound care and transportation to medical services must ensue. In spite of this, organ trauma can be deceiving, and only mild tenderness, muscle guarding and abdominal splinting can hide the severity of the trauma. Organs can hemorrhage slowly for days or even weeks before symptoms of systemic dysfunction or organ failure will be displayed. For this reason, all athletes with significant abdominal trauma should have a medical examination even if they show no obvious signs of organ damage.

For example, a direct blow to the full bladder can result in a rupture, but is uncommon because few athletes are able to participate with a fully distended bladder. Symptoms will include hematuria, difficulty with urination and abdominal rigidity. A blow to the lower back can result in a contused or ruptured kidney, which can also cause the athlete to present with hematuria. Muscle guarding, back and flank pain, nausea, vomiting, and even shock are possible with significant trauma to the kidneys. With enough force

transferred to the abdominal area, intestinal damage and even bowel perforation can occur. Intestinal symptoms will include tenderness to the area, changes in bowel function or bloating, and systemic symptoms such as temperature or blood pressure changes. Intestinal perforations can be confirmed by CT scan or ultrasound where fluid or air would be seen external to the intestine.³

Blunt trauma to the high abdomen, especially to the right side, can result in damage to the liver. Liver trauma can be potentially fatal due to its importance in bodily function, size, and potential to hemorrhage. Those with significant liver trauma can present with rapid heart rate, low blood pressure, abdominal pain, nausea, and blood in vomit, feces or urine.⁴

Lastly, splenic ruptures are a very serious condition, and are the leading cause of death by abdominal trauma in athletics. This can be a concern with any athlete presenting with a systemic illness, like mononucleosis, which causes splenomegaly. Splenic rupture can result in symptoms as serious as internal bleeding and can produce symptoms of shock such as clammy, cool, pale skin and weak rapid pulse. If internal bleeding or pressure from a ruptured spleen is irritating the diaphragm, Kehr's sign will appear, which gives referred pain to the left shoulder and arm.⁵

ASSESSMENT

If any of these serious organ injuries is suspected at an athletic event, the "most medical" professional on the premises should step forward to take responsibility for the situation. A few simple assessment techniques for this responsible professional would be rebound tenderness (Figure 3), vital signs, and common sense questions about the athlete's overall symptoms. To perform the rebound test, press firmly into the abdomen with the pads of your fingers with both hands overlapped and release the pressure quickly. If the athlete complains of significant tenderness after the release of pressure, there is sufficient evidence of organ damage to secure transportation for the athlete for advanced medical treatment. Also, if the player's vital signs are significantly altered or they complain of serious abdominal or systemic symptoms after trauma to the trunk, there should not be any question about their need for medical evaluation. If the player is unsafe to transport or if medical professionals are



Figure 3. The rebound test, note placements of the hands for performance of this test.

on their way, place the player in a position of comfort and continue to monitor their symptoms, but do not give them any liquids to drink. Furthermore, if shock symptoms or the beginning signs of shock are observed, elevate the player's legs to assist blood flow to the head and heart and manage the subsequent scenario appropriately.⁶

CONCLUSION

The abdomen is an extraordinarily important, yet unprotected area of the body. In addition to its lack of protective structure, its size, intermediate location on the body, and proportion of the body's area increases its vulnerability to injury. In nearly all athletic events, injury to the abdomen is a potential hazard, and recognizing the signs of serious damage is imperative. Abdominal injuries can be lethal and the severity of any injury should not be underappreciated, however with proper training and knowledge, these injuries can be effectively managed on and off the field.

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